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Volatile Organic Compound Control Strategy Development for Pulaski County, Arkansas

TRW Environmental Engineering Div, Vienna, VA

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Environmental Protection Agency, Dallas, TX Air and Hazardous Materials Div

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VOLATILE ORGANIC COMPOUND CONTROL STRATEGY DEVELOPMENT FOR PULASKI COUNTY, ARKANSAS

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The report presents a control strategy for attainment of the national standard for photochemical oxidants of .08 ppm. Emission reductions of volatile organic compounds achievable by 1982 are estimated by application of reasonably available control technology (RACT), Stage I vapor recovery, and the Federal Motor Vehicle Control Program (FMVCP). Several scenarios for the modified rollback model are used to determine required emission reductions. Linear rollback produces the largest percent reduction required. Reductions by applying the above control measures are shown to be insufficient for demonstrating attainment by 1982.

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SECTION 1

INTRODUCTION

This report of the control strategy for reducing emissions of volatile organic compounds (VOC) has been prepared as part of the revised State Implementation Plan (SIP) for attainment of National Ambient Air Quality Standards in Pulaski County, Arkansas. Under the requirements of the 1977 Clean Air Act Amendments, each state must submit a revised SIP for each non-attainment area by January 1, 1979 to the U. S. Environmental Protection Agency. Since ambient air quality levels of photochemical oxidants recorded in Pulaski County have been in violation of the standard, the county has been declared a non-attainment area. A control strategy for VOC has been prepared since these compounds are percursors to the formation of photochemical oxidants in the atmosphere. As part of the control strategy, regulations for the control of VOC emissions are included in the report.

SECTION 2

SUMMARY AND RESULTS

The control strategies described in this document are intended to reduce the amount of volatile organic compounds emitted in Pulaski County, Arkansas during 1977. It is estimated that a reduction of 29.2% in the 1977 emissions can be achieved by 1982, the year that attainment of the National Ambient Air Quality Standards is required. This reduction is achieved primarily by reductions in stationary sources and highway vehicles. Stationary source emissions are reduced primarily by the application of reasonably available control technology (RACT) to those sources for which there is currently a Control Technology Guideline document prepared by EPA. The reductions in emissions from highway vehicles are achieved by the change in hydrocarbon emissions resulting from the Federal Motor Vehicle Emissions Control Program. By 1982, the emission factor for hydrocarbons shows a decrease of approximately 53% from the 1977 level. A summary of the emission reductions estimated for 1982 from each source category is shown on Table 2-1.

The amount of emission reduction required by 1982 to achieve the standard of 0.08 ppm varies, depending upon whether a linear rollback or a modified rollback approach is used in determining the reductions. Based on an air quality design value of 0.15 ppm, the linear rollback approach requires a decrease of approximately 47% in the base year emissions. In using the modified rollback approach there are four different scenarios of reductions required depending upon the transport and background values that are used. The range of the required reductions is from 22.2% to 45.5% when using modified rollback. As described in Section 3.2 the achievable reduction of 29.2% is not adequate for attainment of the standard except for one scenario. Since attainment of the standard cannot be demonstrated by 1982 except by the one scenario, further

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TABLE 2-1. SUMMARY of 1982 VOC EMISSIONS REDUCTIONS

	1977 VOC EMISSIONS (tons/year)	1982 VOC EMISSIONS (tons/year)	% REDUCTION
Stationary Point Sources	1903.5	975.7	48.7
Stationary Area Sources	8597.4	7377.6	14.2
Mobile Sources	18682.7	12320.8	34.1
Total	29183.6	20674.1	29.2

emission reduction measures are likely. Under the requirements of the 1977 Clean Air Act Amendments, a motor vehicle emissions inspection and maintenance program is required for urban areas where attainment of the photochemical oxidant standard cannot be demonstrated by 1982. A separate study is currently in progress to provide background data for the implementation of an inspection and maintenance system.

SECTION 3

TECHNICAL BASIS FOR STUDY

3.1 CLEAN AIR ACT

Under the mandate of the 1970 Clean Air Act, the U. S. Environmental Protection Agency (EPA) promulgated primary and secondary National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants.[1] Each state and territory was then required to submit to the Administrator of the EPA a plan for implementation, maintenance and enforcement of the air quality standards in each air quality control region (AQCR) within the state. Also included in these plans were attainment dates for the air quality standards in each AQCR. In those states that did not meet their attainment date, a revised State Implementation Plan (SIP) was required which demonstrated attainment of the standards. The Clean Air Act Amendments of 1977 retained the fundamental approach to air pollution control and also retained the State Implementation Plan as the mechanism for implementing this approach. Under the 1977 amendments, each state is required to submit to the EPA Administrator a list of air quality control regions which have attained standards, those which have not attained standards, and those for which there are insufficient data for classification.

For the air quality control regions not attaining the standards, the respective states must submit a revised SIP by January 1, 1979, which demonstrates attainment of the standards as expeditiously as practicable, but not later than December 31, 1982. For photochemical oxidants and carbon monoxide, an extension to 1987 is available if the state demonstrates that attainment by 1982 is not possible with reasonably available control measures. In the State of Arkansas, Pulaski County has been declared a non-attainment

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area for photochemical oxidants, based on an air quality monitoring project conducted during a three month period in the summer of 1977. A revised SIP is being prepared for Pulaski County, and the control strategies for volatile organic compounds (VOC) described in this document will be part of the SIP.

3.2 EMISSION INVENTORY AND PHOTOCHEMICAL OXIDANT LEVELS

In order to develop a control strategy for VOC, it is necessary to establish the baseline VOC emission level as required by the 1977 Clean Air Act Amendments. To satisfy this requirement an inventory of VOC emissions from all sources in Pulaski County was compiled. The methodology used in compiling this inventory and the results are described in detail in a separate document.[2] A summary of the emissions from stationary point sources, stationary area sources, and mobile sources is presented in Table 3-1.

The ambient air quality level of ozone recorded in Pulaski County during 1977 and which is being used in developing the control strategies is 0.15 ppm, as compared to the existing standard of 0.08 ppm for a one hour average and the proposed standard of 0.10 ppm. The amount of reduction in the base year emissions necessary to obtain the current standard varies from 22.2% to 46.7% depending on whether a linear rollback or a modified rollback approach is used for calculating emissions reductions required. In the linear rollback concept, an assumption is made that ambient air quality levels are directly proportional to emissions entering the atmosphere. Therefore a reduction in emissions produces a corresponding reduction in ambient levels of a pollutant. Required reductions are calculated as follows:

$$\text{Percent Reduction Required} = \frac{A - B}{A} \times 100$$

Where:

A = Design air quality value

B = National Ambient Air Quality Standard

The modified rollback concept takes into consideration the transport and background levels of ozone in a region. Both of these values may vary for each geographical area within a region therefore the emission reductions

TABLE 3-1. PULASKI COUNTY VOC EMISSIONS FOR 1977

STATIONARY SOURCES		VOC EMISSIONS (TONS/YEAR)			
		STATIONARY POINT SOURCE EMISSIONS	STATIONARY AREA SOURCE EMISSIONS	MOBILE SOURCE EMISSIONS	TOTAL BASE YEAR EMISSIONS 1977
PETROLEUM REFINERIES	REFINERY FUGITIVES (LEAKS)				
	MISCELLANEOUS SOURCES A. PROCESS DRAINS AND WASTE B. VACUUM PRODUCING SYSTEMS C. PROCESS UNIT BLOWDOWN				
	OTHER				
STORAGE, TRANSPORTATION & MARKETING OF PETROLEUM PRODUCTS	OIL & GAS PRODUCTION FIELDS				
	NATURAL GAS AND NATURAL GASOLINE PROCESSING PLANTS				
	GASOLINE & CRUDE OIL STORAGE[1]				
	SHIP AND BARGE TRANSFER OF GASOLINE, CRUDE OIL, AND CHEMICALS		0.2		0.2
	BULK GASOLINE TERMINALS[2]	829.0			829.0
	GASOLINE BULK PLANTS[3]	120.7			120.7
	SERVICE STATION LOADING		987.1		987.1
	SERVICE STATION UNLOADING		766.0		766.0
	AVIATION GASOLINE HANDLING		110.8		110.8
INDUSTRIAL PROCESSES	ORGANIC CHEMICAL MANUFACTURE				
	PAINT MANUFACTURE	7.0			7.0
	VEGETABLE OIL PROCESSING	151.2			151.2
	PHARMACEUTICAL MANUFACTURE				
	PLASTIC PRODUCTS MANUFACTURE	335.6			335.6
	RUBBER PRODUCTS MANUFACTURE	62.8			62.8
	TEXTILE POLYMERS MANUFACTURE	43.6			43.6
	OTHERS	1.9			1.9
INDUSTRIAL SURFACE COATING	LARGE APPLIANCES		5.7		5.7
	MAGNET WIRE		182.4		182.4
	AUTOMOBILES		41.2		41.2
	CANS		14.1		14.1
	METAL COILS				
	PAPER	22.4	358.0		380.4
	FABRIC		163.7		163.7
	METAL FURNITURE				
	WOOD FURNITURE	144.0	44.1		188.1
	FLAT WOOD PRODUCTS	1.2	51.1		52.3
	OTHER METAL PRODUCTS	135.6	200.0		335.6
	OTHERS	1.2	352.8		354.0
NON-INDUSTRIAL SURFACE COATINGS	ARCHITECTURAL COATINGS		113.0		113.0
	AUTO REFINISHING	7.4	90.7		98.1
	OTHERS				
OTHER SOLVENT USE	DEGREASING	5.7	182.1		187.8
	DRY CLEANING		152.2		152.2
	GRAPHIC ARTS	34.2	950.6		984.8
	ADHESIVES				
	CUTBACK ASPHALT		0.0		0.0
	OTHER SOLVENT USE		3,726.5		3,726.5
OTHER MISCELLANEOUS	FUEL COMBUSTION				
	SOLID WASTE DISPOSAL				
	FOREST, AGRICULTURAL, AND OTHER OPEN BURNING		105.1		105.1
TOTAL VOC EMISSIONS FROM STATIONARY SOURCES		1,903.5	8,597.4		10,500.9
MOBILE SOURCES	HIGHWAY VEHICLES			16,657.3	16,657.3
	OFF-HIGHWAY VEHICLES			195.5	195.5
	RAIL			74.0	74.0
	AIRCRAFT			749.0	749.0
	VESSELS AND PLEASURE CRAFT			1,006.9	1,006.9
TOTAL VOC EMISSIONS FROM MOBILE SOURCES				18,682.7	
TOTAL VOLATILE ORGANIC COMPOUND EMISSIONS		1,903.5	8,597.4	18,682.7	29,183.6

[1] INCLUDES ALL STORAGE FACILITIES EXCEPT THOSE AT SERVICE STATIONS AND BULK PLANTS.
[2] EMISSIONS FROM LOADING TANK TRUCKS AND RAIL CARS.
[3] EMISSIONS FROM STORAGE AND TRANSFER OPERATIONS.

required will also vary. The modified rollback formula is shown below;

$$\text{Percent Reduction Required} = \frac{\text{AQ adjusted - standard}}{\text{AQ adjusted - A(final transport)}}$$

Where:

AQ adjusted = AQ design - A (reducible transport)

A = additivity factor, generally between 20% and 70%

Reducible transport = original transport (T_o) minus final transport (T_f)

There are four potential scenarios of emission reduction requirements with the use of modified rollback depending on the values used for transport and background. These scenarios are presented in Table 3-2.

3.3 DEFINITION OF STUDY AREA

The control strategy described in the next section is for Pulaski County, which is located in the Central Arkansas Intrastate air quality control region and is also a part of the Little Rock/North Little Rock Standard Metropolitan Statistical Area (S.M.S.A.). The county has a 1977 estimated population of 330,000 persons of which approximately 240,000 are located in the cities of Little Rock and North Little Rock.[3] Industrial activity in Pulaski County includes steel production, metal fabrication, furniture making, textile production, and a wide range of other manufacturing processes.

TABLE 3-2. REQUIRED REDUCTION IN 1977 VOC EMISSION LEVELS IN PULASKI COUNTY[1]

SCENARIO	T_o (ppm)	T_f (ppm)	EMISSION REDUCTION REQUIRED PERCENT	TONS[2]
1	0.08	0.04	45.5	13278.5
2	0.08	0.02	36.4	10622.8
3	0.12	0.04	33.3	9718.1
4	0.12	0.02	22.2	6478.8
5	LINEAR ROLLBACK		46.7	13628.7

[1]BASED ON AIR QUALITY DESIGN VALUE OF 0.15 ppm

[2]FROM 1977 LEVEL OF 29183.6 TONS

SECTION 4

CONTROL STRATEGY DEVELOPMENT

This section describes the results of the control strategy development and the methodology used in determining the amount of reductions in the 1977 emission level that is achievable in Pulaski County by 1982.

4.1 ACHIEVABLE EMISSION REDUCTIONS

Based on the 1977 VOC emission level of 29183.6 tons, it is estimated that a reduction of 29.2% can be achieved by 1982, reducing the emissions to 20674.1 tons. Based on the reductions required as shown in Table 3-2, the reduction of 29.2% is insufficient to attain the standard except under scenario 4 which requires a 22.2% reduction. The next scenario (No. 3), requires a 33.3% reduction or an additional 1208.6 tons from the 1977 level, which does not appear to be achievable.

The reductions in emissions that can be achieved by 1982 are primarily a result of the application of reasonably available control technology (RACT) to stationary sources and credit for the Federal Motor Vehicle Control Program in reducing emissions from highway vehicles. In calculating the 1982 emissions, growth was considered as required for the development of SIP revisions. Each of the major source categories and their resultant emission reductions are described in the following sections and summarized on Table 4-1.

4.2 STATIONARY POINT SOURCES

The results of the emission inventory indicated that stationary point sources account for approximately 7% of the VOC emissions in Pulaski County. Of the stationary sources inventoried, seven sources emit or have

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TABLE 4-1. SUMMARY OF 1977 AND 1982 EMISSION PROJECTIONS

STATIONARY SOURCES		VOC MISSIONS (TONS/YEAR)					
		1977 EMISSIONS		1977 TOTAL	1982 EMISSIONS		1982 TOTAL
		POINT	AREA		POINT	AREA	
PETROLEUM REFINERIES	REFINERY FUGITIVES (LEAKS)						
	MISCELLANEOUS SOURCES A. PROCESS DRAINS AND WASTE B. VACUUM PRODUCING SYSTEMS C. PROCESS UNIT BLOWDOWN						
	OTHER						
STORAGE, TRANSPORTATION & MARKETING OF PETROLEUM PRODUCTS	OIL & GAS PRODUCTION FIELDS						
	NATURAL GAS AND NATURAL GASOLINE PROCESSING PLANTS						
	GASOLINE & CRUDE OIL STORAGE[1]						
	SHIP AND BARGE TRANSFER OF GASOLINE, CRUDE OIL, AND CHEMICALS		0.2			0.3	
	BULK GASOLINE TERMINALS[2]	829.0			209.1		
	GASOLINE BULK PLANTS[3]	120.7			120.7		
	SERVICE STATION LOADING		987.1			174.1	
	SERVICE STATION UNLOADING		766.0			935.4	
	AVIATION GASOLINE HANDLING		110.8			129.2	
INDUSTRIAL PROCESSES	ORGANIC CHEMICAL MANUFACTURE						
	PAINT MANUFACTURE	7.0			7.0		
	VEGETABLE OIL PROCESSING	151.2			151.2		
	PHARMACEUTICAL MANUFACTURE						
	PLASTIC PRODUCTS MANUFACTURE	335.6			715.8		
	RUBBER PRODUCTS MANUFACTURE	62.8			62.8		
	TEXTILE POLYMERS MANUFACTURE	43.6			43.6		
	OTHERS	1.9			1.9		
INDUSTRIAL SURFACE COATING	LARGE APPLIANCES		5.7			5.1	
	MAGNET WIRE		182.4			204.6	
	TRANSPORTATION EQUIPMENT		41.2			39.7	
	CANS		14.1			14.1	
	METAL COILS						
	PAPER	22.4	358.0		22.4	404.0	
	FABRIC		163.7			163.7	
	METAL FURNITURE						
	WOOD FURNITURE	144.0	44.1		0.0	51.1	
	FLAT WOOD PRODUCTS	1.2	51.1		1.2	18.8	
	OTHER METAL PRODUCTS	135.6	200.0		91.5	216.7	
	OTHERS	1.2	353.8		1.2	319.5	
NON-INDUSTRIAL SURFACE COATINGS	ARCHITECTURAL COATINGS		113.3			140.2	
	AUTO REFINISHING	7.4	90.7		7.4	97.5	
	OTHERS						
OTHER SOLVENT USE	DEGREASING	5.7	182.1		5.7	151.5	
	DRY CLEANING		152.2			131.1	
	GRAPHIC ARTS	34.2	950.6		34.2	1104.6	
	ADHESIVES						
	CUTBACK ASPHALT		0.0			0.0	
	OTHER SOLVENT USE		3726.5			2961.3	
OTHER MISCELLANEOUS	FUEL COMBUSTION						
	SOLID WASTE DISPOSAL						
	FOREST, AGRICULTURAL, AND OTHER OPEN BURNING		105.1			105.1	
TOTAL VOC EMISSIONS FROM STATIONARY SOURCES		1903.5	8597.4	10500.9	975.7	7377.6	8353.3
MOBILE SOURCES	HIGHWAY VEHICLES	16657.3			10192.8		
	OFF-HIGHWAY VEHICLES	195.5			217.5		
	RAIL	74.0			74.7		
	AIRCRAFT	749.0			767.0		
	VESSELS AND PLEASURE CRAFT	1006.9			1068.8		
TOTAL VOC EMISSIONS FROM MOBILE SOURCES		18682.7		18682.7	12320.9		12320.8
TOTAL VOLATILE ORGANIC COMPOUND EMISSIONS				29183.6			20671.1

[1] INCLUDES ALL STORAGE FACILITIES EXCEPT THOSE AT SERVICE STATIONS AND BULK PLANTS.
[2] EMISSIONS FROM LOADING TANK TRUCKS AND RAIL CARS.
[3] EMISSIONS FROM STORAGE AND TRANSFER OPERATIONS.

the potential to emit 100 tons or more of VOC per year. These seven sources which are listed in Table 4-2 account for approximately 82% of the stationary point source emissions in Pulaski County. Most of these sources are candidates for RACT and their projected 1982 emissions are also included in Table 4-2. The major emission sources as shown on this table include bulk gasoline terminals which have a daily throughput of 76,000 liters (20,000 gallons) or greater. These facilities are currently utilizing RACT for working and breathing losses from petroleum product storage therefore no further emission reductions are available from storage tanks. Emission reductions can be achieved however in the filling of tank trucks with the implementation of a vapor balance system. As shown in Table 4-2, the three gasoline terminals show a total decrease of over 600 tons of VOC with a vapor balance system. In each case a straight refrigeration system based on gasoline vapor condensation by refrigeration at atmospheric pressure is applied to the sources.

The sources listed in Table 4-2 are the only sources found in Pulaski County for which RACT is currently available. All of the stationary point sources which were included in the inventory are listed in Table A-1 in the Appendix.

4.3 STATIONARY AREA SOURCES

Area sources are typically smaller than point sources and usually more difficult to control because of their size. In Pulaski County, area sources are a significant contributor to the total emission loading, accounting for approximately 29% of the base year 1977 emissions. The major categories of area source emissions are gasoline vapor losses at service stations and "other solvent use," which includes household use of solvents and unaccounted for solvent losses.

The total 1982 emissions from area sources show a decrease of approximately 1220 tons or 14% from the 1977 level. This decrease is achieved by the implementation of Stage I vapor balance systems for gasoline service stations and the reduction in other solvent use that is projected by 1982. The RACT guidelines were applied only to service station gasoline loading

TABLE 4-2. STATIONARY POINT SOURCE EMISSION REDUCTIONS

SOURCE	VOC EMISSIONS (TONS/YEAR) 1977	1982	APPLICABLE CONTROL TECHNOLOGY GUIDELINE (CTG)
1. A. O. SMITH-INLAND INC.	335.6	215.8	SURFACE COATING OF PAPER (RACT)
2. BUCKEYE CELLULOSE CORP.	151.2	151.2	NO REDUCTION AVAILABLE
3. EXXON CO.	313.5	66.0	VAPOR RECOVERY FOR GASOLINE TERMINALS (RACT)
4. FRANKLIN ELECTRIC	99.7	55.6	SURFACE COATING OF COILS (RACT)
5. GULF OIL CO.	151.9	39.9	VAPOR RECOVERY FOR GASOLINE TERMINALS (RACT)
6. LA GLORIA OIL AND GAS CO.	363.6	103.2	VAPOR RECOVERY FOR GASOLINE TERMINALS (RACT)
7. LITTLE ROCK FURNITURE MFG-CO.	144.0	0	NOT APPLICABLE-OPERATIONS TERMINATED IN JUNE, 1978
TOTAL	1559.5	631.7	

operations and degreasing (solvent metal cleaning) in the area source categories. Since area source emissions are usually based on population, employment or economic activity, they do not lend themselves to emission control through the application of control equipment. The emissions estimates made for the 1977 inventory were based primarily on employment data for each of the respective Standard Industrial Classification (SIC) codes. This was one of the procedures suggested in a recent EPA guideline document.(4) The 1982 projections were based on the growth in these same SIC codes and were compared for consistency with growth projections made by Federal and State agencies where this information was available. Among the agencies surveyed were the organizations involved in implementing sections 201 and 208 of the Federal Water Pollution Control Act (FWPCA), the Department of Housing and Urban Development (HUD), the Bureau of the Census, and the University of Arkansas Industrial Research and Extension Center. The growth projections for the 1977-1982 area source emissions are presented in Table 4-3 for the following major source categories: Storage, Transportation and Marketing of Petroleum Products; Industrial Surface Coatings; Non-Industrial Surface Coatings; and Other Solvent Use. These projections are based on historical trends in employment and economic activity and do not consider RACT except for service station loading and degreasing as mentioned earlier. Both of these sources showed emission reductions for 1982.

In calculating the 1982 emissions from degreasing operations, a reduction of 40% for open top degreasers was assumed which can be achieved by excellent compliance with good operating practices.(5) Since most degreasing operations in Pulaski County are too small to require control equipment, good operating practices provide the only means for emission reduction. The implementation of this will account for a reduction of 101 tons from the 1977 level.

Additional emissions reduction may be achieved by 1982 with the application of RACT guidelines which are currently being developed for several stationary sources. The sources in Pulaski County which may fall into these categories include Graphic Arts (printing), Surface Coating of Other Metal Products, and Service Stations, Stage II. These sources account for approximately 1917 tons of VOC emissions in 1977.

TABLE 4-3. SUMMARY OF GROWTH FACTORS AND 1982 EMISSION PROJECTIONS FOR AREA SOURCES[1]

Source Category	1977 Emissions (tons/year)	1977-1982 Growth Factor	1982 Emissions (tons/year)
Storage, Transportation and Marketing of Petroleum Products			
Ship and Barge Transfer	0.2	1.3663	0.3
Service Station Loading	987.1	0.1764	174.1
Service Station Unloading	766.0	1.2212	935.4
Aviation Gasoline Handling	110.8	1.1660	129.2
Industrial Surface Coating			
Large Appliances	5.7	0.9030	5.1
Magnet Wire	182.4	1.1216	204.6
Transportation Equipment	41.2	0.9633	39.7
Cans	14.1	1.0000	14.1
Paper	358.0	1.1286	404.0
Fabric	163.7	1.0000	163.7
Wood Furniture	44.1	1.3865	61.1
Flat Wood Furniture	51.1	0.3675	18.8
Other Metal Products	200.0	1.0834	216.7
Others	352.8	0.9057	319.5

[1]A description of the methodology used in determining the growth factors is described in the Appendix.

TABLE 4.3. (CONTINUED)

Non-Industrial Surface Coatings			
Architectural Coatings	113.0	1.2407	140.2
Auto Refinishing	90.7	1.0749	97.5
Other Solvent Use			
Degreasing	182.1	0.8319	151.5
Dry Cleaning	152.2	0.8612	131.1
Graphic Arts	950.6	1.1620	1104.6
Cutback Asphalt	0.0	0.0	0.0
Other Solvent Use	3726.5	0.7947	2961.3

4.4 MOBILE SOURCES

Based on the 1977 emission iventory, mobile sources comprise the largest source of VOC emissions in Pulaski County, contributing approximately 64% of the total emissions. Highway vehicles by themselves account for approximately 57% of the total emissions in the county. Highway vehicles also provide the greatest amount of emission reduction potential, approximately 33% between 1977 and 1982. The following sections describe the methodology used in projecting the 1982 emissions.

4.4.1 Highway Vehicles

The large reduction in VOC emissions from highway vehicles, from 16,657.3 tons in 1977 to 10,192.8 tons in 1982 is due to the change in the emission factor for hydrocarbons as a result of the implementation of the Federal Motor Vehicle Emission Control Program. The 1982 emission factor was calculated from the Mobile Source Emissions Model[6] with the total emissions calculated as follows:

1982 VOC Emissions (tons/year) = 16,657.3 (0.523)(1.17)

Where:

17,140.4 = 1977 emissions from highway vehicles

0.523 = Reduction in emission factor from 1977 to 1982 at a weighted speed of 43.6 mph. Emission factor in 1977 = 7.42 and in 1982 = 3.88. Therefore 3.88/7.42 = 0.523.

1.17 = Growth in VMT in Pulaski County, estimated by Federal Highway Administration.

4.4.2 Off-Highway Vehicles

This category includes agricultural, industrial, construction and lawn and garden equipment. The 1982 emissions for each of these sources with the exception of lawn and garden equipment were based on economic growth projections from the Section 208 study for the Federal Water Pollution Control Act. The growth factors and the resultant 1982 emissions are shown below:

	1977 Emissions (tons/year)	Growth Factor	1982 Emissions (tons/year)
Agricultural Equipment	44.8	0.93	41.7
Industrial Equipment	21.3	1.36	28.9
Construction Equipment	34.6	1.34	46.4

Lawn and garden equipment emissions in the inventory were based on the number of single unit dwellings in Pulaski County. The 1982 emissions projections were based on the assumption that housing units will grow in proportion to population, and were calculated as follows:

1982 emissions = 94.8 x 350,306/330,000 = 100.6

Where:

94.8 = 1977 emissions

350,306 = 1982 Pulaski County population

330,000 = 1977 Pulaski County population

4.4.3 Railroads

The 1982 emissions from railroad operations were based on historical trends in fuel consumption for the railroad companies operating in Arkansas.[7] Growth in fuel consumption was calculated for both road service and rail yard switching operations. The following data were used to calculate the 1982 emissions:

	1977 Fuel Use (gals)	1982 Fuel Use (gals)	Growth Factor
Road Service	1,849,576	1,861,220	1.006
Rail Yard Switching	12,680	15,983	1.26

	1977 Emissions (tons/year)	Growth Factor	1982 Emissions (tons/year)
Road Service	72.9	1.006	73.3
Rail Yard Switching	1.1	1.26	1.4
Total	74.0		74.7

4.4.4 Aircraft

Emissions projections for aircraft were based on growth in air traffic estimated by the Federal Aviation Administration.(8) The growth factors used for each category of aircraft (military, general aviation, air carrier, air taxi, and helicopters) is shown on Table 4-4.

4.4.5 Vessels and Pleasure Craft

Vessels

Emission estimates for 1982 were based on historical growth trends in tonnage of materials handled at the Port of Little Rock during the years 1963-1976.(9) Using a linear regression analysis, the 1982 tonnage was estimated to be 9,250,000 tons as compared with 6,538,434 tons in 1976. This represents a growth of approximately 41.5%. Applied to the 1976 emissions of 5.0 tons/year, the projected 1982 emissions are 7.1 tons/year.

Pleasure Craft

Since there was no historical data available on the number of motorboat registrations, the 1982 emissions were estimated by assuming that the number of pleasure craft would increase at the same rate as the population in Pulaski County. The estimated 1982 population is 350,306 compared with 330,000 in 1977, which represents an increase of approximately 6 percent. The 1982 emissions are therefore calculated as:

1982 emissions = (1.06)(1001.6) = 1061.7

Where:

1001.6 = 1977 VOC emissions

TABLE 4-4. AIRCRAFT VOC EMISSIONS PROJECTIONS

AIRCRAFT	LTO CYCLES 1977	LTO CYCLES 1982	RATIO	VOC EMISSIONS (TONS/YEAR) 1977	VOC EMISSIONS (TONS/YEAR) 1982
MILITARY	70,674	70,674	1.0	667.1	667.1
GENERAL AVIATION	75,154	98,223	1.307	20.8	27.2
AIR CARRIER	9,262	10,276	1.109	52.8	58.5
AIR TAXI	2,997	5,165	1.72	8.1	14.0
HELICOPTER	673	673	1.0	0.2	0.2
				749.0	767.0

APPENDIX A

STATIONARY POINT SOURCE EMISSIONS

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TABLE A-1. POINT SOURCE VOC EMISSIONS FOR PULASKI COUNTY[a]

SOURCE	1977 EMISSIONS (TONS/YEAR)
AFCO STEEL, INC.	12.3
AGL CORP.	1.3
A. O. SMITH-INLAND, INC.	335.6
ARMSTRONG RUBBER CO.	62.8
BUCKEYE CELLULOSE CORP.	151.2
DIMAC MANUFACTURING CO., INC.	1.6
ECONO AUTO PAINTING	7.4
EXXON, INC.	313.5
FRANKLIN ELECTRIC CO.	99.7
GULF OIL, INC.	151.9
HERMAN BINZ AND SONS	2.5
INTERNATIONAL GRAPHICS	34.2
LA GLORIA OIL AND GAS CO.	363.6
LITTLE ROCK FURNITURE MFG. CO.	144.0
MASONITE CORP.	22.4
MOBIL OIL CORP.	31.3
MURPHY OIL CORP.	42.2
ROL-LIFT CORP.	11.6
SOUTHERN SCREW MACHINE PRODUCTS	4.1
STAUFFER CHEMICAL CO.	1.9

[a] ONLY THOSE SOURCES REPORTING EMISSIONS GREATER THAN ONE TON/YEAR ARE LISTED.

TABLE A-1. (CONCLUDED)

SOURCE	1977 EMISSIONS (TONS/YEAR)
STEBBINS AND ROBERTS, INC.	7.0
SUPERWOOD CORP.	1.2
TELETYPE CORP.	1.2
TEXACO, INC.	47.2
TRIANGLE ENGINEERING	6.6
W. R. GRACE AND CO.	43.6
WACO MANUFACTURING CO.	1.6
TOTAL	1903.5

(a) ONLY THOSE SOURCE REPORTING EMISSIONS GREATER THAN ONE TON/YEAR ARE LISTED.

APPENDIX B

VOC EMISSION REGULATIONS

REGULATIONS FOR THE CONTROL OF VOLATILE ORGANIC COMPOUNDS IN PULASKI COUNTY, ARKANSAS

SECTION 1. TITLE

The following rules and regulations of the Department of Pollution Control and Ecology of the State of Arkansas, adopted in accordance with the provisions of Part II of the Arkansas Water and Air Pollution Control Act, hereinafter referred to as the "Act" (Ark. Stats. Ann. 82-1901,set seq.), shall be known as the Regulations for the Control of Volatile Organic Compounds in Pulaski County, Arkansas.

SECTION 2. PURPOSE

Promulgation and enforcement of these Regulations of the Plan is intended to meet the requirements of the Clean Air Act (42 USCA §1857, et seq.), as interpreted by the United States Environmental Protection Agency, including but not limited to attainment and maintenance of the National Ambient Air Quality Standards, and qualification for delegation to the Arkansas Department of Pollution Control and Ecology by the United States Environmental Protection Agency of authority to enforce said federal statute and regulations promulgated pursuant thereto.

SECTION 3. DEFINITIONS

When used in these regulations, the following definitions apply:

(a) "Arkansas Air Pollution Control Code" means rules and regulations adopted by the Department of Pollution Control and Ecology of the State of Arkansas, as amended from time to time, pursuant to and in furtherance of the Act. Provisions of the Arkansas Air Pollution Control Code shall not be considered a part of the Plan except for those provisions specifically described in the Plan.

(b) "Approved" means acceptance by the designated air pollution control official.

(c) "Capture system" means the equipment (including hoods, ducts, fans, etc.) used to contain, capture, or transport a pollutant to a control device.

(d) "Coating applicator" means an apparatus used to apply a surface coating.

(e) "Coating line" means one or more apparatus or operations which include a coating applicator, flash-off area, and oven wherein a surface coating is applied, dried and/or cured.

(f) "Construction" means commencement of onsite fabrication, erection, or installation of an emission source, air pollution control equipment, or a facility.

(g) "Control device" means equipment (incinerator, adsorber, or the like) used to destroy or remove air pollutant(s) prior to discharge to the ambient air.

(h) "Continuous vapor control system" means a vapor control system that treats vapors displaced from tanks during filling on a demand basis without intermediate accumulation.

(j) "Day" means a 24-hour period beginning at midnight.

(k) "Department" means the Department of Pollution Control and Ecology of the State of Arkansas. When reference is made in these Regulations to actions taken by or with reference to the Department, the reference is to the staff of the Department acting at the direction of the Commission.

(m) "Director" means the Director of the Department of Pollution Control and Ecology.

(n) "Emission" means the release or discharge, whether directly or indirectly, of any air pollutant in to the ambient air from any source.

(o) "Equipment" means any device, except equipment used for any mode of transportation, capable of causing the emission of an air contaminant into the open air, and any stack, conduit, flue, duct, vent or similar device connected or attached to, or serving the equipment.

(p) "Facility" means any building, structure, installation, activity, or combination thereof which contains a stationary source of air contaminants.

(q) "Flashoff area" means the space between the application area and the oven.

(r) "Hydrocarbon" means any organic compound of carbon and hydrogen only.

(s) "Incinerator" means a combustion apparatus designed for high temperature operation in which solid, semisolid, liquid, or gaseous combustible wastes are ignited and burned

efficiently and from which the solid and gaseous residues contain little or no combustible material.

(t) "Intermittent vapor control system" means a vapor control system that employs an intermediate vapor holder to accumulate vapors displaced from tanks during filling. The control device treats the accumulated vapors only during automatically controlled cycles.

(u) "Loading rack" means an aggregation or combination of gasoline loading equipment arranged so that all loading outlets in the combination can be connected to a tank truck or trailer parked in a specified loading space.

(w) "Organic material" means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

(x) "Oven" means a chamber within which heat is used to bake, cure, polymerize, and/or dry a surface coating.

(y) "Owner or operator" means any person who owns, leases, controls, operates or supervises a facility, an emission source, or air pollution control equipment.

(z) "Person" means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their legal representative, agent or assignee.

(aa) "Prime coat" means the first film of coating applied in a two-coat operation.

(bb) "Reasonably available control technology" (RACT) means the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. It may require technology that has been applied to similar, but not necessarily identical, source categories.

(cc) "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases as determined by the American Society for Testing and Materials, Part 17, 1973, D-323-72 (Reapproved 1977).

(dd) "Shutdown" means the cessation of operation of a facility or emission control equipment.

(ee) "Solvent" means organic materials which are liquid at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

(ff) "Standard conditions" means a temperature of 20°C (68 F) and pressure of 760 millimeters of mercury (29.92 inches of mercury).

(gg) "Startup" means the setting in operation of a source or emission control equipment.

(hh) "Stationary source" means any article, machine, process equipment, or other contrivance from which air pollutants emanate or are emitted, either directly or indirectly, from a fixed location.

(jj) "Topcoat" means the final film of coating applied in a multiple coat operation.

(kk) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss from Floating Roof Tanks," 1962.

(mm) "Vapor collection system" means a vapor transport system which uses direct displacement by the liquid loaded to force vapors from the tank into a vapor control system.

(oo) "Vapor control system" means a system that prevents release to the atmosphere of at least 90 percent by weight of organic compounds in the vapors displaced from a tank during the transfer of gasoline.

(pp) "Volatile organic compound" (also denoted as VOC) means any compound of carbon that has a vapor pressure greater than 0.1 millimeters of mercury at standard conditions excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

SECTION 4. GENERAL PROVISIONS

Section 4.1 Applicability

(a) After July 31, 1979, these Regulations apply throughout Pulaski County, Arkansas, in accordance with the schedules in Section 6, to all sources of volatile organic compound emissions.

(b) These Regulations will not apply to:

(1) sources whose emissions of volatile organic compounds are not more than 6.8 kilograms (15 pounds) in any 1 day, nor more than 1.4 kilograms (3 pounds) in any 1 hour, provided the emission rates are determined and certified before October 1, 1979, in a manner approved by the Director.

(2) sources used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance provided:

(i) the operation of the source is not an integral part of the production process; and,

(ii) the emissions from the source do not exceed 363 kilograms (800 pounds) in any calendar month; and,

(iii) the exemption is approved in writing by the Director.

(c) For the purposes of these Regulations the following will not be considered volatile organic compounds:

(1) Methane

(2) Ethane

(3) 1,1,1-Trichloroethane (Methyl Chloroform)

(4) Trichlorotrifluoroethane (Freon 113)

Section 4.2 Required and Prohibited Acts

(a) After July 31, 1979, no owner or operator of a source of volatile organic compounds may operate, cause, allow or permit the operation of the source, unless:

(1) the operation and emissions of the source are at all times in conformance with Section 5, except as allowed under Section 4.4; and,

(2) a Standard Operating Procedure, which includes a detailed description of process and/or emission control equipment startup, operating, and shutdown procedures for minimization of volatile organic compound release, has been submitted to and approved by the Director; and,

(3) a Standard Maintenance Procedure, which provides for the operation of the volatile organic

compound source in conformance with paragraphs (a) (1) and (a) (2) of this section, has been submitted to and approved by the Director.

Section 4.3 Recordkeeping, Reporting, Monitoring

(a) The owner or operator of any volatile organic compound emission source or control equipment shall maintain, as a minimum: records detailing all activities relating to any Compliance Schedule under Section 6; records detailing all Malfunctions under Section 4.4; records detailing startups and shutdowns under Section 4.2; and records of all Testing conducted under Section 7; plus records of all Monitoring conducted under paragraphs (c) (1) and (c) (2) of this section.

(b) The owner or operator of any volatile organic compound emission source or control equipment shall submit to the Director, as a minimum, annual reports detailing the nature, specific sources, and total annual quantities of all volatile organic compound emissions. However, the Director may require more frequent reports where necessary to accomplish the purposes of these Regulations.

(c) The owner or operator of any volatile organic compound emission source or control equipment shall:

(1) install, operate, and maintain process and/or control equipment monitoring instruments or procedures as necessary to comply with paragraphs (a) and (b) of this section; and,

(2) maintain, in writing, data and/or reports relating to monitoring instruments or procedures which will, upon review, document the compliance status of the volatile organic compound emission source or control equipment to the satisfaction of the Director.

(d) Copies of all records and reports under paragraphs (a), (b), and (c) of this section shall be retained by the owner or operator for a minimum of 4 years after the date on which the record was made or the report submitted and may not thereafter be discarded, destroyed or removed without the express written approval of the Director.

(e) Copies of all records and reports under this section shall immediately be made available to the Director, upon verbal or written request, at any reasonable time.

Section 4.4 Malfunctions, Breakdowns, Upsets

(a) Emissions in excess of these Regulations which are temporary and result solely from a sudden and unavoidable breakdown, malfunction or upset of process or emission control equipment, or sudden and unavoidable upset of operation will not be considered a violation of these Regulations provided:

(1) the owner or operator notifies the Director of any such occurrence within 1 hour of the occurrence; and,

(2) the owner or operator demonstrates to the Director that the suggested period of time for correction is as expeditious as practicable; and,

(3) breakdown or upset is determined by the Director to be unavoidable and not the result of negligence; and,

(4) within 5 days after the beginning of the occurrence, a written report is submitted to the Director which includes the cause and nature of the event, estimated quantity of volatile organic compounds emitted, time of emission and steps taken to control the emission and to prevent recurrence; and,

(5) the Director considers the suggested period of time for correction to be reasonable and necessary; and,

(6) the Director is immediately notified when corrective measures have been accomplished.

Section 4.5 Petition for Alternative Controls

(a) If the owner or operator of any source of volatile organic compounds can demonstrate that compliance with Section 5 regulations would be technologically infeasible he may petition the Director to allow the use of alternative operational and/or equipment controls for the reduction of volatile organic compound emissions. Petition must be made for each source within a given facility. The petition must be submitted in writing to the Director before December 31, 1979, and must contain:

(1) the name and address of the company and the name and telephone number of a company officer over whose signature the petition is submitted; and,

(2) a description of all operations conducted at the location to which the petition applies and the purpose that the volatile organic compound emitting

equipment serves within the operations; and,

(3) reference to the specific operational and/or equipment controls under Section 5 for which alternative operational and/or equipment controls are proposed; and,

(4) a detailed description of the proposed alternative operational and/or equipment controls, the magnitude of volatile organic compound emission reduction which will be achieved, and the quanitity and composition of volatile organic compounds which will be emitted if the alternative operational and/or equipment controls are instituted; and,

(5) a plan, which will be instituted in addition to the proposed alternative operational and/or equipment controls, to reduce volatile organic compound emissions from other source operations, not required under Section 5; such that aggregate volatile organic compound emissions from the facility will in no case be greater through application of the alternative control than would be permitted through conformance with Section 5; and,

(6) a schedule for the installation and/or institution of the alternative operational and/or equipment controls in conformance with Section 6; and,

(7) certification that emissions of all other air contaminants from the subject source are in compliance with all applicable local, state and federal laws and regulations.

(b) The Director may approve a Petition for Alternative Control if:

(1) the petition is submitted in accordance with paragraph (a) of this section; and,

(2) the Director determines that the petitioner cannot comply with Section 5 because of technological infeasibility (considering costs); and,

(3) all other air contaminant emissions from the subject source are in compliance with, or under a schedule for compliance as expeditiously as practicable with, all applicable local, state, and federal regulations; and,

(4) the petition contains a schedule for achieving and maintaining reduction of volatile organic compound

emissions to the maximum extent feasible and as expeditiously as practicable; and,

(5) a nuisance condition will not result from operation of the source as proposed in the Petition; and,

(6) the aggregate volatile organic compound emissions from the facility are not more than would result from compliance with Section 5.

Section 4.6 Circumvention

(a) No owner or operator subject to these Regulations may build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable Regulation.

(b) Paragraph (a) of this section includes, but is not limited to, the use of gaseous dilutants to achieve compliance and the piecemeal carrying out of an operation to avoid coverage by a Regulation that applies only to operations larger than a specified size.

SECTION 5. PROVISIONS FOR SPECIFIC PROCESSES

Section 5.1 Disposal of Volatile Organic Compounds

(a) After July 31, 1979, no person may cause, allow, or permit the disposal of more than 5.7 liters (1.5 gallons) of any volatile organic compounds, or of any materials containing more than 5.7 liters (1.5 gallons) of any volatile organic compounds, in any 1 day in a manner that would permit their evaporation into the atmosphere.

(b) Paragraph (a) of this section includes, but is not limited to, the disposal of volatile organic compounds which must be removed from volatile organic compound control devices so as to maintain the control devices at their required operating efficiency.

Section 5.2 Automobile and Light Duty Truck Manufacturing

(a) For the purpose of this section, the following definitions apply:

(1) "Application area" means the area where the coating is applied by dipping or spraying.

(2) "Manufacturing plant" means a facility where parts are manufactured and/or finished for eventual

inclusion into a finished product ready for sale to vehicle dealers. Customizers, body shops and other repainters are not part of this definition.

(3) "Automobile" means all passenger cars or passenger car derivatives capable of seating 12 or fewer passengers.

(4) "Flashoff area" means the space between the application area and the oven.

(5) "Light-duty trucks" means any motor vehicles rated at 3864 kilograms (8500 pounds) gross weight or less which are designed primarily for purpose of transportation or are derivatives of such vehicles.

(b) Notwithstanding Section 4.1, after July 31, 1979, this section will apply, in accordance with Section 6, to the application area(s), flashoff area(s), and oven(s) of automotive and light-duty truck manufacturing plants involved in prime, topcoat and final repair coating operations.

(c) This section will not apply to sources exempted under Section 4.1 (b).

(d) (1) Notwithstanding Section 4.2 (a), no owner or operator of an automotive or light-duty truck manufacturing plant subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of:

(i) 0.23 kilograms per liter of coating (1.9 pounds per gallon), excluding water, delivered to the applicator from prime application, flashoff area and oven operations.

(ii) 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to the applicator from topcoat application, flashoff area and oven operations.

(iii) 0.58 kilograms per liter of coating (4.8 pounds per gallon), excluding water, delivered to the applicator from final repair application, flashoff area and oven operations.

(2) The emission limits under paragraph (d) (1) of this section shall be achieved by:

(i) the application of low solvent content coating technology; or,

(ii) incineration, provided that 90 percent of the nonmethane volatile organic compounds (VOC measured as total combustible carbon) which enter the incinerator are oxidized to carbon dioxide and water; or,

(iii) a system demonstrated to have control efficiency equivalent to or greater than provided under paragraph (d)(2)(i) or (d)(2)(ii) of this section and approved by the Director.

(3) The design, operation, and efficiency of any capture system used in conjunction with paragraphs (d)(2)(ii) and (d)(2)(iii) of this section shall be certified in writing by the owner or operator and approved by the Director.

Section 5.3 Can Coating

(a) For the purpose of this section, the following definitions apply:

(1) "End sealing compound" means a synthetic rubber compound which is coated on to can ends and which functions as a gasket when the end is assembled on the can.

(2) "Exterior base coating" means a coating applied to the exterior of a can to provide exterior protection to the metal and to provide background for the lithographic or printing operation.

(3) "Interior base coating" means a coating applied by roller coater or spray to the interior of a can to provide a protective lining between the can metal and product.

(4) "Interior body spray" means a coating sprayed on the interior of the can body to provide a protective film between the product and the can.

(5) "Overvarnish" means a coating applied directly over ink to reduce the coefficient of friction, to provide gloss and to protect the finish against abrasion and corrosion.

(6) "Three-piece can side-seam spray" means a coating sprayed on the exterior and interior of a welded, cemented or soldered seam to protect the exposed metal.

(7) "Two-piece can exterior end coating" means a coating applied by roller coating or spraying to the exterior end of a can to provide protection to the metal.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to coating applicator(s) and oven(s) of sheet, can or end coating lines involved in sheet basecoat (exterior and interior) and overvarnish; two-piece can exterior (basecoat and overvarnish); two and three-piece can interior body spray; two-piece can exterior end (spray or roll coat); three-piece can side-seam spray and end sealing compound operations.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a can coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of;

(i) 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to the coating applicator from sheet basecoat (exterior and interior) and overvarnish or two-piece can exterior (basecoat and overvarnish) operations.

(ii) 0.51 kilograms per liter of coating (4.2 pounds per gallon), excluding water, delivered to the coating applicator from two- and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

(iii) 0.66 kilograms per liter of coating (5.5 pounds per gallon), excluding water, delivered to the coating applicator from three-piece can side-seam spray operations.

(iv) 0.44 kilograms per liter of coating (3.7 pounds per gallon), excluding water, delivered to the coating applicator from end sealing compound operations.

(2) The emission limits under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5.4 Coil Coating

(a) For the purpose of this section, the following definitions apply:

(1) "Coil coating" means the coating of any flat metal sheet or strip that comes in rolls or coils.

(2) "Quench area" means a chamber where the hot metal exiting the oven is cooled by either a spray of water or a blast of air followed by water cooling.

(b) Notwithstanding Section 4.1, after July 31, 1978 this section will apply, in accordance with Section 6, to the coating applicator(s), oven(s) and quench area(s) of coil coating lines involved in prime and top coat or single coat operations.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a coil coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.31 kilograms per liter of coating (2.6 pounds per gallon), excluding water, delivered to the coating applicator from prime and topcoat or single coat operations.

(2) The emission limit under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5-6 Paper Coating

(a) For the purpose of this section, the following definitions apply:

(1) "Knife coating" means the application of a coating material to a substrate by means of drawing the substrate beneath a knife that spreads the coating evenly over the full width of the substrate.

(2) "Paper coating" means coatings put on paper and pressure sensitive tapes regardless of substrate. Related web coating processes on plastic films and decorative coatings on metal foil are included in this definition.

(3) "Roll coating" means the application of a coating material to a substrate by means of hard rubber or steel rolls.

(4) "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substrate.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to roll, knife or rotogravure coater(s) and drying oven(s) of paper coating lines.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.3(a), no owner or operator of a paper coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to the coating applicator from a paper coating line.

(2) The emission limit under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5.7 Fabric and Vinyl Coating

(a) For the purpose of this section, the following definitions apply:

(1) "Fabric coating" means the coating of a textile substrate with a knife, roll or rotogravure coater to impart properties that are not initially present, such as strength, stability, water or acid repellancy, or appearance.

(2) "Knife coating" means the application of a coating material to a substrate by means of drawing the substrate beneath a knife that spreads the coating evenly over the full width of the substrate.

(3) "Roll coating" means the application of a coating material to a substrate by means of hard rubber or steel rolls.

(4) "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substrate.

(5) "Vinyl coating" means applying a decorative or protective topcoat or printing on vinyl coated fabric or vinyl sheets.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to roll, knife or rotogravure coater(s) and drying oven(s) of fabric and vinyl coating lines.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a fabric coating line or a vinyl coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of;

(i) 0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to the coating applicator from a fabric coating line.

(ii) 0.45 kilograms per liter of coating (3.8 pounds per gallon), excluding water, delivered to the coating applicator from a vinyl coating line.

(2) The emission limits under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5.8 Metal Furniture Coating

(a) For the purpose of this section, the following definitions apply:

(1) "Application area" means the area where the coating is applied by spraying, dipping or flowcoating techniques.

(2) "Metal furniture coating" means the surface coating of any furniture made of metal or any metal part which will be assembled with other metal, wood, fabric, plastic or glass parts to form a furniture piece.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to the application area(s), flashoff area(s), and oven(s) of metal furniture coating lines involved in prime and topcoat or single coating operations.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a metal furniture coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.36 kilograms per liter of coating (3.0 pounds per gallon), excluding water, delivered to the coating applicator from prime and topcoat or single coat operations.

(2) The emission limit under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5.9 Surface Coating of Large Appliances

(a) For the purpose of this section, the following definitions apply:

(1) "Application area" means the area where the coating is applied by spraying, dipping or flowcoating techniques.

(2) "Single coat" means a single film of coating applied directly to the metal substrate omitting the primer application.

(3) "Large appliances" means doors, cases, lids, panels and interior support parts of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dishwashers, trash compactors, air conditioners and other similar products.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to application area(s), flashoff area(s), and oven(s) of large appliance coating lines involved in prime, single or topcoat coating operations.

(c) This section will not apply to;

(1) sources exempted under Section 4.1(b); or,

(2) the use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 0.95 liters (1 quart) in any one 8-hour period.

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a large appliance coating line subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to the coating applicator from prime, single or topcoat coating operations.

(2) The emission limit under paragraph (d)(1) of this section shall be achieved by the methods described in Section 5.2.

Section 5.10 Magnet Wire Coating

(a) For the purpose of this section, the following definition applies:

(1) "Magnet wire coating" means the process of applying a coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

(b) Notwithstanding Section 4.1, after July 31, 1978 this section will apply, in accordance with Section 6, to the oven(s) of magnet wire coating operations.

(c) This section will not apply to sources exempted under Section 4.1(b).

(d) (1) Notwithstanding Section 4.2(a), no owner or operator of a magnet wire coating oven subject to this section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.20 kilograms per liter of coating (1.7 pounds per gallon), excluding water, delivered to the coating applicator from magnet wire coating operations.

(2) The emission limit under paragraph (d)(1) of this section shall be achived by the methods described in Section 5.2.

Section 5.11 Petroleum Liquid Storage

(a) For the purpose of this section, the following definitions apply:

(1) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.

(2) "Crude oil" means a naturally occurring mixture which consists of hydrocarbons and/or sulfur, nitrogen and/or oxygen derivatives of hydrocarbons and which is a liquid at standard conditions.

(3) "Custody transfer" means the transfer of produced crude oil and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(4) "External floating roof" means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the petroleum liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

(5) "Internal floating roof" means a cover or roof in a fixed roof tank which rests upon or is floated upon the petroleum liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

(6) "Petroleum liquids" means crude oil, condensate, and any finished or intermediate products manufactured or extracted in a petroleum refinery.

(7) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oils, or through redistillation, cracking, extraction, or reforming of unfinished petroleum derivatives.

(b) Notwithstanding Section 4.1, after July 31, 1978 this section will apply, in accordance with Section 6, to all fixed roof storage vessels with capacities greater than 150,000 liters (39,000 gallons) containing volatile petroleum liquids whose true vapor pressure is greater than 10.5 kilo Pascals (1.52 psia).

(c) This section will not apply to volatile petroleum liquid storage vessels;

(1) equipped with external floating roofs before January 1, 1979; or,

(2) having capacities less than 1,600,000 liters (416,000 gallons) used to store produced crude oil and condensate prior to lease custody transfer.

(d) Except as provided under paragraph (c) of this section, no owner or operator of an effected source under paragraph (b) of this section shall permit the use of such source unless;

(1) the source has been retrofitted with an internal floating roof equipped with a closure seal, or seals, to close the space between the roof edge and tank wall; or,

(2) the source has been retrofitted with equally effective alternative control, approved by the Director; and,

(3) the source is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials; and,

(4) all openings, except stub drains are equipped with covers, lids, or seals such that;

(i) the cover, lid, or seal is in the closed position at all times except when in actual use; and,

(ii) automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports; and,

(iii) rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting; and,

(5) routine inspections are conducted through roof hatches once per month; and,

(6) a complete inspection of cover and seal is conducted whenever the tank is emptied for nonoperational reasons or once per year; and,

(7) records are maintained in accordance with Section 4.3 that shall include;

(i) reports of the results of inspections conducted under paragraphs (d)(5) and (d)(6) of this section; and,

(ii) a record of the average monthly storage temperatures and true vapor pressures of volatile petroleum liquids stored; and,

(iii) records of the throughput quantities and types of volatile petroleum liquids for each storage vessel.

Section 5.12 Bulk Gasoline Plants

(a) For the purpose of this section, the following definitions apply:

(1) "Bottom filling" means the filling of a tank truck or stationary storage tank through an opening that is flush with the tank bottom.

(2) "Bulk gasoline plant" means a gasoline storage and distribution facility with an average daily throughput of less than 76,000 liters (20,000 gallons) which receives gasoline from bulk terminals by trailer transport, stores it in tanks, and subsequently dispenses it via account trucks to local farms, businesses, service stations.

(3) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 27.6 kPa (4 pounds) or greater.

(4) "Splash filling" means the filling of a tank truck or stationary storage tank through a pipe or hose whose discharge opening is above the surface level of the liquid in the tank being filled.

(5) "Submerged filling" means the filling of a tank truck or stationary tank through a pipe or hose whose discharge opening is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

(6) "Vapor balance system" means a combination of pipes or hoses which create a closed system between the vapor spaces of an unloading tank and a receiving tank such that vapors displaced from the receiving tank are transferred to the tank being unloaded.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to the unloading, loading, and storage facilities of all bulk gasoline plants and all tank trucks or trailers delivering or receiving gasoline at bulk gasoline plants.

(c) This section will not apply to;

(1) stationary storage tanks of less than 2,000 liters (528 gallons) capacity notwithstanding Section 4.6; or,

(2) sources exempted under Section 4.1(b)

(d) Except as provided under paragraph (c) of this section, no owner or operator of a bulk gasoline plant may permit stationary storage tanks to load or unload gasoline unless each tank is equipped with a vapor balance system as described under paragraph (g) of this section and approved by the Director; and,

(1) each tank is equipped with a submerged fill pipe, approved by the Director; or,

(2) each tank is equipped with a fill line whose discharge opening is flush with the bottom of the tank.

(e) Except as provided under paragraph (c) of this section, no owner or operator of a bulk gasoline plant, tank truck or trailer may permit the loading or unloading of tank trucks or trailers at a bulk gasoline plant unless each tank truck or trailer is equipped with a vapor balance system as described under paragraph (g) of this section and approved by the Director; and,

(1) equipment is available at the bulk gasoline plant to provide for the submerged filling of each tank truck or trailer; or,

(2) each tank truck or trailer is equipped for bottom filling.

(f) Notwithstanding Section 4.2(a), no owner or operator of a bulk gasoline plant, tank truck or trailer may permit the transfer of gasoline between tank truck or trailer and stationary storage tank unless;

(1) the transfer is conducted in accordance with paragraphs (d) and (e) of this section; and,

(2) the vapor balance system is in good working order and is connected and operating; and,

(3) tank truck or trailer hatches are closed at all times during loading operations; and,

(4) there are no leaks in the tank trucks' or trailers' pressure/vacuum relief valves and hatch covers, nor the truck tanks or storage tanks or associated vapor and liquid lines during loading or unloading; and,

(5) the pressure relief valves on storage vessels and tank trucks or trailers are set to release at no less than 4.8 kPa (0.7 psi) or the highest possible pressure (in accordance with state or local fire codes, or the National Fire Prevention Association guidelines).

(g) Vapor balance systems required under paragraph (d) and (e) of this section shall consist of the following major components;

(1) a vapor space connection on the stationary storage tank equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

(2) a connecting pipe or hose equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

(3) a vapor space connection on the tank truck or trailer equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material.

(h) Notwithstanding Section 5.1, no owner or operator of a bulk gasoline plant may permit gasoline to be spilled, discarded in sewers, stored in open containers or handled in any other manner that would result in evaporation.

Section 5.13 Bulk Gasoline Terminals

(a) For the purpose of this section, the following definitions apply:

(1) "Bulk gasoline terminal" means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers

gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has a daily throughput of more than 76,000 liters (20,000 gallons) of gasoline.

(2) "Gasoline" means a petroleum distillate having a Reid vapor pressure of 27.6 kPa (4 pounds) or greater.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to bulk gasoline terminals and the appurtenant equipment necessary to load the tank truck or trailer compartments.

(c) No person may load gasoline into any tank trucks or trailers from any bulk gasoline terminal unless;

(1) the bulk gasoline terminal is equipped with a vapor control system, capable of complying with paragraph (d) of this section, properly installed, in good working order, in operation and consisting of one of the following;

(i) an adsorber or condensation system which processes and recovers at least 90 percent by weight of all vapors and gases from the equipment being controlled; or,

(ii) a vapor collection system which directs all vapors to a fuel gas system; or,

(iii) a control system, demonstrated to have control efficiency equivalent to or greater than paragraphs (c)(1)(i) or (c)(1)(ii) of this section and approved by the Director; and,

(2) all displaced vapors and gases are vented only to the vapor control system; and,

(3) a means is provided to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected; and,

(4) all loading and vapor lines are equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

(d) Sources effected under paragraph (c)(1) may not allow mass emissions of volatile organic compounds from control equipment to exceed 80 milligrams per liter (4.7 grains per gallon) of gasoline loaded.

(e) Sources effected under paragraph (b) may not;

(1) allow gasoline to be discarded in sewers or stored in open containers or handled in any manner that would result in evaporation; nor,

(2) allow the pressure in the vapor collection system to exceed the tank truck or trailer pressure relief settings.

Section 5.14 Gasoline Service Stations-Stage I

(a) For the purpose of this section, the following definitions apply:

(1) "Gasoline" means a petroleum distillate having a Reid vapor pressure of 27.6 kPa (4 pounds) or greater.

(2) "Delivery Vessel" means tank trucks or trailers equipped with a storage tank and used for the transport of gasoline from sources of supply to stationary storage tanks of gasoline dispensing facilities.

(3) "Submerged Fill Pipe" means any fill pipe with a discharge opening which is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

(4) "Owner" means any person who has legal or equitable title to the gasoline storage tank at a facility.

(5) "Operator" means any person who leases, operates, controls or supervises a facility at which gasoline is dispersed.

(6) "Gasoline Dispensing Facility" means any site where gasoline is dispersed to motor vehicle gasoline tanks from stationary storage tanks.

(b) Notwithstanding Section 4.1, after July 31, 1979 this section will apply, in accordance with Section 6, to all gasoline dispensing facilities.

(c) This section will not apply to;

(1) transfers made to storage tanks of gasoline dispensing facilities equipped with floating roofs or their equivalent which have been approved by the Director.

(2) stationary gasoline storage containers of less than 2,085 liters (550 gallons) capacity used exclusively for the fueling of implements of husbandry, provided the containers are equipped with submerged fill pipes.

(d) Except as provided under paragraph (c) of this section, no owner or operator may transfer or cause or allow the transfer of gasoline from any delivery vessel into any stationary storage tank described under paragraphs (d)(1) and (d)(2) of this section, unless the tank is equipped with a submerged fill pipe and the vapors displaced from the storage tank during filling are processed by a vapor control system in accordance with paragraph (e) of this section;

(1) any stationary storage tank located at a gasoline dispensing facility, with a capacity of 7,580 liters (2,000 gallons) or more, which is in place before July 31, 1979; and,

(2) any stationary storage tank located at a gasoline dispensing facility, with a capacity of 948 liters (250 gallons) or more, which is installed after July 31, 1979.

(e) The vapor control system required by paragraph (d) of this section shall include one or more of the following;

(1) a vapor-tight line from the storage tank to the delivery vessel and a system that will ensure the vapor line is connected before gasoline can be transferred into the tank; or,

(2) a refrigeration - condensation system or equivalent designed to recover at least 90 percent by weight of the organic compounds in the displaced vapor; or,

(3) a system demonstrated to have control efficiency equivalent to or greater than provided under paragraph (e)(1) or (e)(2) of this section and approved by the Director.

(f) The vapor-laden delivery vessel shall be subject to the following conditions;

(1) the delivery vessel must be designed and maintained to be vapor tight at all times; and,

(2) the vapor-laden delivery vessel may be refilled only at;

(i) bulk gasoline plants complying with Section 5.12; or,

(ii) bulk gasoline terminals complying with Section 5.13.

(g) Each owner of a gasoline storage tank covered by paragraphs (b) and (d) of this section shall;

(1) purchase and install all necessary control systems and make all necessary process modifications in accordance with paragraphs (d), (e), and (f) of this section; and,

(2) in accordance with Sections 4.2 and 4.4, provide instructions to the operator of the gasoline dispensing facility describing necessary maintenance operations and procedures for prompt notification of the owner in case of any malfunctions of the control system; and,

(3) repair, replace or modify any worn out or malfunctioning component or element of design and keep records, in accordance with Section 4.3, of the repair, replacement or modification of any component or element of design of the control system.

(h) Each operator of a gasoline dispensing facility covered by (b) and (d) of this section shall;

(1) maintain and operate the control system in accordance with the specifications and the operating and maintenance procedures specified by the owner; and,

(2) promptly notify the owner of the control system of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system; and,

(3) maintain records, in accordance with Section 4.3 of all maintenance performed by the operator and of all notifications to the owner of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system and the action taken by the owner. Such records shall at a minimum include;

(i) the scheduled date for maintenance or the date a malfunction was detected; and,

(ii) the date the need for maintenance or malfunction of major system components was reported to the owner; and,

(iii) the date the maintenance was performed or the malfunction corrected by either the operator or the owner; and,

(4) maintain gauges, meters, or other specified testing devices in proper working order.

Section 5.15 Petroleum Refinery Sources

(a) For the purpose of this section, the following definitions apply:

(1) "Accumulator" means the reservoir of a condensing unit receiving the condensate from the condenser.

(2) "Condensor" means any heat transfer device used to liquefy vapors by removing their latent heats of vaporization. Such devices include, but are not limited to, shell and tube, coil, surface, or contact condensers.

(3) "Firebox" means the chamber or compartment of a boiler or furnace in which materials are burned but does not mean the combustion chamber of an incinerator.

(4) "Forebays" mean the primary sections of a wastewater separator.

(5) "Hot well" means the reservoir of a condensing unit receiving the warm condensate from the condenser.

(6) "Petroleum refinery," means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation, cracking, extraction, or reforming of unfinished petroleum derivatives.

(7) "Refinery fuel gas" means any gas which is generated by a petroleum refinery process unit and which is combusted, including any gaseous mixtures of natural gas and fuel gas.

(8) "Turnaround" means the procedure of shutting a refinery unit down after a run to do necessary maintenance and repair work and putting the unit back on stream.

(9) "Vacuum producing system" means any reciprocating, rotary, or centrifugal blower or compressor, or any jet ejector or device that takes suction from a pressure below atmospheric and discharges against atmospheric pressure.

(10) "Vapor recovery system" means a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds emitted during the operation of any transfer, storage, or process equipment.

(11) "Wastewater (oil/water) separator" means any device or piece of equipment which utilizes the difference in density between oil and water to remove oil and associated chemicals from water, or any device, such as a flocculation tank, clarifier, etc., which removes petroleum derived compounds from waste water.

(b) Notwithstanding Section 4.2, after July 31, 1979 this section will apply, in accordance with Section 6, to vacuum producing systems, wastewater separators, and process unit turnarounds at petroleum refining sources.

(c) (1) The owner or operator of any vacuum producing systems at a petroleum refinery may not permit the emission of any noncondensable volatile organic compounds from the condensers, hot wells or accumulators of the system.

(2) The emission limit under paragraph (c)(1) of this section shall be achieved by;

(i) piping the noncondensable vapors to a firebox or incinerator; or,

(ii) compressing the vapors and adding them to the refinery fuel gas.

(d) The owner or operator of any wastewater (oil/water) separators at a petroleum refinery shall;

(1) provide covers and seals approved by the Director, on all separators and forebays; and,

(2) equip all openings in covers, separators, and forebays with lids or seals such that the lids or seals are in the closed position at all times except when in actual use.

(e) Notwithstanding Section 6, before November 1, 1979 the owner or operator of a petroleum refinery shall develop and submit to the Director for approval a detailed

procedure for minimization of volatile organic compound emissions during process unit turnaround. As a minimum, the procedure shall provide for;

(1) depressurization venting of the process unit or vessel to a vapor recovery system, flare or firebox; and,

(2) no emission of volatile organic compounds from a process unit or vessel until its internal pressure is 136 kilo Pascals (19.7 psia) or less; and,

(3) recordkeeping of the following items in accordance with Section 4.3;

(i) every date that each process unit or vessel is shut down; and,

(ii) the approximate vessel volatile organic compound concentration when the volatile organic compounds were first discharged to the atmosphere; and,

(iii) the approximate total quantity of volatile organic compounds emitted to the atmosphere.

Section 5.16 Solvent Metal Cleaning

(a) For the purpose of this section, the following definitions apply:

(1) "Cold cleaning" means the batch process of cleaning and removing soils from metal surfaces by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. Wipe cleaning is not included in this definition.

(2) "Conveyorized degreasing" means the continuous process of cleaning and removing soils from metal surfaces by operating with either cold or vaporized solvents.

(3) "Freeboard height" means the distance from the top of the vapor zone to the top of the degreaser tank.

(4) "Freeboard ratio" means the freeboard height divided by the width of the degreaser.

(5) "Open top vapor degreasing" means the batch process of cleaning and removing soils from metal surfaces

by condensing hot solvent vapor on the colder metal parts.

(6) "Solvent metal cleaning" means the process of cleaning soils from metal surfaces by cold cleaning or open top vapor degreasing or conveyorized degreasing.

(b) Notwithstanding Section 4.1, after July 21, 1978 this section will apply, in accordance with Section 6, to cold cleaning, open top vapor degreasing and conveyorized degreasing operations.

(c) The provisions of this section shall apply with the following exceptions;

(1) open top vapor degreasers with an open area smaller than 1 square meter (10.8 square feet) shall be exempt from paragraphs (e)(3)(ii) and (e)(3)(iv) of this section,

(2) conveyorized degreasers with an air/vapor interface smaller than 2.0 square meters (21.6 square feet) shall be exempt from paragraph (f)(2) of this section,

(3) sources exempted under Section 4.1(b).

(d) Except as provided under paragraph (c) of this section, the owner or operator of a cold cleaning facility shall;

(1) equip the cleaner with a cover and the cover shall be so designed that it can be easily operated with one hand; if,

(i) the solvent volatility is greater than 2 kilo Pascals (15 millimeters of mercury or 0.3 pounds per square inch) measured at 38°C (100°F); or,

(ii) the solvent is agitated; or,

(iii) the solvent is heated; and,

(2) equip the cleaner with a facility for draining cleaned parts and the drainage facility shall be constructed internally so that parts are enclosed under the cover while draining if the solvent volatility is greater than 4.3 kilo Pascals (32 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), except that the drainage facility may be external for

applications where an internal type cannot fit into the cleaning system; and,

(3) install one of the following control devices if the solvent volatility is greater than 4.3 kilo Pascals (33 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), or if the solvent is heated above 50°C (120°F);

(i) freeboard that gives a freeboard ratio greater than or equal to 0.7; or,

(ii) water cover (solvent must be insoluble in and heavier than water); or,

(iii) other systems of equivalent control, such as refrigerated chiller or carbon adsorption, approved by the Director; and,

(4) provide a permanent, conspicuous lable, summarizing the operating requirements; and,

(5) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(6) close the cover whenever parts are not being handled in the cleaner; and,

(7) drain the cleaned parts for at least 15 seconds or until dripping ceases; and,

(8) if used, supply a solvent spray that is a solid fluid stream (not a fine, atomized or shower type spray) at a pressure which does not cause excessive splashing.

(e) Except as provided under paragraph (c) of this section, the owner or operator of an open top vapor degreaser shall;

(1) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and,

(2) provide the following safety switches;

(i) a condenser flow switch and thermostat which shut off the pump heat if the condenser

coolant is either not circulating or warm; and,

(ii) a spray safety switch which shuts off the spray pump if the vapor level drops more than 10 centimeters (4 inches); and,

(3) install one of the following control devices;

(i) powered cover, if the freeboard ratio is greater than or equal to 0.75, and if the degreaser opening is greater than 1 square meter (10 square feet); or,

(ii) refrigerated chiller; or,

(iii) enclosed design (cover or door opens only when the dry part is actually entering or exiting the degreaser); or,

(iv) carbon adsorption system, with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when cover is open), and exhausting less than 25 parts per million of solvent averaged over one complete adsorption cycle; or,

(v) a control system, demonstrated to have control efficiency equivalent to or greater than any of the above, and approved by the Director; and,

(4) keep the cover closed at all times except when processing work loads through the degreaser; and

(5) minimize solvent carryout by;

(i) racking parts to allow complete drainage; and,

(ii) moving parts in and out of the degreaser at less than 3.3 meters per second (11 feet per minute); and,

(iii) holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and,

(iv) tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and

(v) allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and,

(6) not degrease porous or absorbent materials, such as cloth, leather, wood or rope; and,

(7) not occupy more than half of the degreaser's open top area with a workload; and,

(8) not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is removed from the vapor zone; and,

(9) always spray below the vapor level; and,

(10) repair solvent leaks immediately, or shutdown the degreaser; and,

(11) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(12) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(13) not use ventilation fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser open area, unless necessary to meet OSHA requirements; and,

(14) provide a permanent, conspicuous label, summarizing the operating procedures of paragraphs (e)(4) through (e)(12) of this section.

(f) Except as provided under paragraph (c) of this section, the owner or operator of a conveyorized degreaser shall;

(1) not use workplace fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser opening, unless necessary to meet OSHA requirements; and,

(2) install one of the following control devices;

(i) refrigerated chiller; or,

(ii) carbon adsorption system, with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when downtime covers are open), and exhausting less than 25 parts per million of solvent by volume averaged over a complete adsorption cycle; or,

(iii) a system, demonstrated to have a control efficiency equivalent to or greater than paragraph (f)(2)(i) or (f)(2)(ii) of this section, and approved by the Director; and,

(3) equip the cleaner with equipment, such as a drying tunnel or rotating (tumbling) basket, sufficient to prevent cleaned parts from carrying out solvent liquid or vapor; and,

(4) provide the following safety switches;

(i) a condenser flow switch and thermostat which shut off the pump heat if the condenser coolant is either not circulating or too warm; and,

(ii) a spray safety switch which shuts off the spray pump or the conveyor if the vapor level drops more than 10 centimeters (4 inches); and,

(iii) a vapor level control thermostat which shuts off the pump heat when the vapor level rises too high; and,

(5) minimize openings during operation so that entrances and exits will silhouette workloads with an average clearance between the parts and the edge of the degreaser opening of less than 10 centimeters (4 inches) or less than 10 percent of the width of the opening; and,

(6) provide downtime covers for closing off the entrance and exit during shutdown hours; and,

(7) minimize carryout emissions by;

(i) racking parts for best drainage; and,

(ii) maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and,

(8) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(9) repair solvent leaks immediately, or shut down the degreaser; and,

(10) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(11) place downtime covers over entrances and exits of conveyorized degreasers immediately after the conveyors and exhausts are shut down and not remove them until just before start-up.

Section 5.17 Cutback Asphalt

(a) For the purpose of this section, the following definitions apply:

(1) "Asphalt" means a dark-brown to black cementitious material (solid, semisolid, or liquid in consistency) in which the predominating constituents are bitumens which occur in nature as such or which are obtained as residue in refining petroleum.

(2) "Cutback Asphalt" means asphalt cement which has been liquefied by blending with petroleum solvents (diluents). Upon exposure to atmospheric conditions the diluents evaporate, leaving the asphalt cement to perform its function.

(3) "Emulsified Asphalt" means an emulsion of asphalt cement and water which contains a small amount of an emulsifying agent; a heterogeneous system containing two normally immiscible phases (asphalt and water) in which the water forms the continuous phase of the emulsion, and minute globules of asphalt form the discontinuous phase.

(4) "Penetrating Prime Coat" means an application of low-viscosity liquid asphalt to an absorbent surface. It is used to prepare an untreated base for an asphalt surface. The prime penetrates the base and plugs the voids, hardens the top, and helps bind it to the overlying asphalt course. It also reduces the necessity of maintaining an untreated base course prior to placing the asphalt pavement.

(b) Notwithstanding Section 4.1, after July 21, 1979 this section will apply to the manufacture and use of cutback asphalts.

(c) (1) No person may cause, allow or permit the manufacture, mixing, storage, use or application of cutback asphalts without approval of the Director as provided in paragraph (c)(2) of this section.

(2) The Director may approve the manufacture, mixing, storage, use or application of cutback asphalts where;

(i) long-life stockpile storage is necessary; or,

(ii) the use or application at ambient temperatures less than $10^{o}C$ ($50^{o}F$) is necessary; or,

(iii) the cutback asphalt is to be used solely as a penetrating prime coat.

Section 6 COMPLIANCE SCHEDULES

Section 6.1 Process and Emission Control Equipment Installations

(a) Except as provided under Section 6.4 or Section 6.5, the owner or operator of a volatile organic compound emission source proposing to install and operate volatile organic compound emission control equipment and/or replacement process equipment to comply with Section 5 shall adhere to the increments of progress contained in the following schedule;

(1) Final plans for the emission control system and/or process equipment must be submitted before December 31, 1979.

(2) Contracts for the emission control systems and/or process equipment must be awarded or orders must be issued for purchase of component parts to accomplish emission control before July 1, 1980.

(3) Initiation of on-site construction or installation of the emission control and/or process equipment must begin before September 1, 1980.

(4) On-site construction or installation of the emission control and/or process equipement must be completed before December 1, 1980.

(5) Final compliance, determined in accordance with Section 7 shall be achieved before January 1, 1981.

(6) Any owner or operator of a stationary emission source subject to the compliance schedule of this section shall certify to the Director within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

Section 6.2 Low Solvent Content Coating

(a) Except as provided under Section 6.4 or Section 6.5 or under paragraph (b) of this section, the owner or operator of a volatile organic compound emission source proposing to employ low solvent content coating technology to comply with Section 5 shall adhere to the increments of progress contained in the following schedule;

(1) Final plans for the application of low solvent content coating technology must be submitted before January 1, 1980.

(2) Research and development of low solvent content coating must be completed before July 1, 1980.

(3) Evaluation of product quality and commercial acceptance must be completed before January 1, 1981.

(4) Purchase orders must be issued for low solvent content coatings and process modifications before March 1, 1981.

(5) Initiation of process modifications must begin before May 1, 1981.

(6) Process modifications must be completed and use of low solvent content coatings must begin before September 1, 1981.

(7) Final compliance, determined in accordance with Section 7 shall be achieved before October 1, 1981.

(8) Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Director within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

(b) Where the Director determines that low solvent content coating technology has been sufficiently researched and developed for a particular application, the owner or operator of a volatile organic compound emission source proposing to comply with Section 5 through application of low solvent content coatings shall adhere to the increments

of progress contained in the following schedule;

(1) Final plans for the application of low solvent content coating technology must be submitted before January 1, 1980.

(2) Evaluation of product quality and commercial acceptance must be completed before July 1, 1980.

(3) Purchase orders must be issued for low solvent content coatings and process modifications before September 1, 1980.

(4) Initiation of process modifications must begin before October 1, 1980.

(5) Process modifications must be completed and use of low solvent content coatings must begin before March 1, 1981.

(6) Final compliance, determined in accordance with Section 7, shall be achieved before April 1, 1981.

(7) Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Director within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

Section 6.3 Equipment Modification

(a) Except as provided under Section 6.4 or Section 6.5, the owner or operator of a volatile organic compound emission source proposing to comply with Section 5 by modification of existing processing equipment shall adhere to the increments of progress contained in the following schedule;

(1) Final plans for process modification must be submitted before January 1, 1980.

(2) Contracts for process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish process modifications before February 1, 1980.

(3) Initiation of on-site construction or installation of process modifications must begin before April 1, 1980.

(4) On-site consturction or installation of process

modifications must be completed before August 1, 1980.

(5) Final compliance, determined in accordance with Section 7, shall be achieved before September 1, 1980.

(6) Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Director within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

Section 6.4 Alternate Compliance Schedules

(a) Nothing in Section 6 shall prevent the Director from promulgating a separate schedule for any source if he finds that the application of a compliance schedule in Section 6.1 through Section 6.3 would be technologically infeasible.

(b) Nothing in Section 6 shall prevent the owner or operator of a volatile organic compound source from submitting to the Director a proposed alternative compliance schedule provided;

(1) the proposed alternative compliance schedule is submitted before October 1, 1979, and;

(2) the final control plans for achieving compliance with Section 5 are submitted simultaneously, and;

(3) the alternative compliance schedule contains the same increments of progress as the schedule for which it is proposed, and;

(4) sufficient documentation and certification from appropriate suppliers, contractors, manufacturers, or fabricators is submitted by the owner or operator of the volatile organic compound source to justify the dates proposed for the increments of progress.

(c) All alternative compliance schedules proposed or promulgated under this section shall provide for compliance of the volatile organic compound emission source with Section 5 as expeditiously as practicable but not later than December 31, 1982.

(d) Any schedule approved under this section may be revoked at any time if the source does not meet the increments of progress stipulated.

Section 6.5 Exception Sections 6.1 through Section 6.4 will not apply to sources which are in compliance with Section 5 before July 1, 1979 and have determined and certified compliance to the satisfaction of the Director before September 1, 1979.

Section 7 TEST METHODS AND PROCEDURES

Section 7.1 General Provisions

(a) The owner or operator of any volatile organic compound source required to comply with Section 5 shall, at his own expense, demonstrate compliance by the methods of Section 7 or an alternative method approved by the Director. All tests shall be made by, or under the direction of, a person qualified by training and/or experience in the field of air pollution testing.

(b) No volatile organic compound emissions compliance testing will be allowed, nor the results accepted, unless prior notification has been supplied to the Director as required under paragraph (c) and (d) of this section and the Director has granted approval.

(c) Any person proposing to conduct a volatile organic compound emissions test shall notify the Director, in the manner set forth under paragraph (d) of this section, of the intent to test not less than 30 days before the proposed initiation of the tests so the Director may at his option observe the test.

(d) Any person notifying the Director of a proposed volatile organic compound emissions test shall include as part of notification the following minimum information;

(1) a statement indicating the purpose of the proposed test and the applicable subsection of Section 5; and,

(2) a detailed description of the facility to be tested; and,

(3) a detailed description of the test procedures, equipment, and sampling sites; and,

(4) a timetable, setting forth the dates on which;

(i) the testing will be conducted; and,

(ii) preliminary test results will be reported (not later than 15 days after sample collection); and,

(iii) the final test report will be submitted (not later than 30 days after completion of on-site sampling); and,

(5) proposed corrective actions should the tests show noncompliance.

(e) For compliance determination, the owner or operator of any volatile organic compound emissions souce shall be responsible for providing;

(1) sampling ports, pipes, lines, or appurtenances for the collection of samples and data required by the test procedure; and,

(2) safe access to the sample and data collection locations; and,

(3) light, electricity, and other utilities required for sample and data collection.

Section 7.2 Determination of Volatile Content of Surface Coatings

(a) This method applies, in accordance with Section 7.1, to paint, varnish, lacquer, and surface coatings which are air-dried or force-dried.

(b) This method does not apply to any coating system requiring a special curing process such as;

(1) exposure to temperatures in excess of 110°C (230°F) to promote thermal cross-linking; or,

(2) exposure to ultraviolet light to promote cross-linking.

(c) For the purposes of this method, the applicable surface coatings are divided into three classes. They are:

(1) Class I: General Solvent-Type Paints. This class includes white linseed oil outside paint, white soya and phthalic alkyd enamel, white linseed o-phthalic alkyd enamel, red lead primer, zinc chromate primer, flat white inside enamel, white epoxy enamel, white vinyl toluene modified alkyd, white amino modified baking enamel, and other solvent-type paints not included in Class II.

(2) Class II: Varnishes and Lacquers. This class includes clear and pigmented lacquers and varnishes.

(3) Class III: Water Thinned Paints. This class includes emulsion or latex paints and colored enamels.

(d) For the purposes of this method, a representative sample of the surface coating shall be obtained at the point of delivery to the coater or any other point in the process that the Director approves.

(e) The volatile organic content of the sample shall be determined as follows:

(1) Assign the coating to one of the three classes in paragraph (c) of this section. Assign any coating not clearly belonging to Class II or III to Class I.

(2) Determine the density D_m (in grams/cubic centimeter) of the paint, varnish, lacquer, or related product according to the procedure outlined in ASTM D 1475-60, Standard Method of Test for Density of Paint, Varnish, Lacquer, and Related Products. Then, depending on the class of the coating, use one of the following specified procedures to determine the volatile content;

(i) Class I. Use the procedure in ASTM D 2369-73, Standard Method of Test for Volatile Content of Paints.

(A) Record the following information:

W_1 = Weight of dish and sample, grams

W_2 = Weight of dish and sample after heating, grams

S = Sample weight, grams

(B) Compute the volatile matter content C_v (in grams/liter of paint) as follows:

$$C_v = \frac{(W_1 - W_2)(D_m)(10^3)}{S}$$

(C) To convert grams/liter to pounds/gallon, multiply C_v by 8.3455×10^{-3}.

(ii) Class II. Use the procedure in ASTM D 1644-59 Method A. Standard Methods of Test for Nonvolatile Content of Varnishes (Do not use Method B).

(A) Record the following information:

A = Weight of dish, grams

B = Weight of sample used, grams

C = Weight of dish and contents after heating, grams.

(B) Compute the volatile matter content C_v (in grams/liter) as follows:

$$C_v = \frac{(A + B - C)(D_m)(10^3)}{B}$$

(C) To convert grams/liter to pounds/gallon, multiply C_v by 8.3455×10^{-3}.

(iii) Class III. Use the procedure in ASTM D 2369-73, Standard Method of Test for Volatile Content of Paints.

(A) Record the same information as specified in paragraph (e)(2)(i) of this section.

(B) Determine the water content P (in percent water) of the paint according to the procedure outlined in Federal Standard 141a, Method 4082.1, Water in Paint and Varnishes (Karl Fischer Titration Method).

(C) Compute the nonaqueous volatile matter content C_v (in grams/liter) as follows:

$$C_v = \frac{(W_1 - W_2 - 0.01\ PS)(D_m)(10^3)}{S}$$

(D) To convert grams/liter to pounds/gallon, multiply C_v by 8.3455×10^{-3}.

Section 7.3 Determination of Volatile Organic Compound Emission Control System Efficiency

(a) The provisions of this section are generally applicable, in accordance with Section 7.1, to any test method employed to determine the collection or control efficiency of any device or system designed, installed, and operated for the purpose of reducing volatile organic compound emissions.

(b) The following procedures shall be included in any efficiency determination:

(1) The volatile organic compound containing material shall be sampled and anlyzed in a manner approved by the Director such that the quantity of emissions that could result from the use of the material can be quantified.

(2) The efficiency of any capture system used to transport the volatile organic compound emissions from their point of origination to the control equipment shall be computed using accepted engineering practice and in a manner approved by the Director.

(3) Samples of the volatile organic compound containing gas stream shall be taken simultaneously at the inlet and outlet of the emissions control device in a manner approved by the Director.

(4) The total combustible carbon content of the samples shall be determined by a method approved by the Director.

(5) The efficiency of the control device shall be expressed as the fraction of total combustible carbon content reduction achieved.

(6) The volatile organic compound mass emission rate shall be the sum of emissions from the control device, emissions not collected by the capture system and capture system losses.

Section 7.4 Determination of Solvent Metal Cleaning Volatile Organic Compound Emissions

(a) This method is applicable to determining volatile organic compound emissions from solvent metal cleaning equipment.

(b) The purpose of this method is to quantify, by material balance, the amount of solvent input into a degreaser over a sufficiently long period of time so that an average emission rate can be computed.

(c) The following procedure shall be followed to perform a material balance test:

(1) Clean the degreaser sump before testing.

(2) Record the amount of solvent added to the tank with a flow meter.

(3) Record the weight and type of work load degreased each day.

(4) At the end of the test run, pump out the used solvent and measure the amount with a flow meter. Also, estimate the volume of metal chips and other material remaining in the emptied sump, if significant.

(5) Bottle a sample of the used solvent and analyze it to find the percent that is oil and other contaminants. The oil and solvent proportions can be estimated by weighing samples of used solvent before and after boiling off the solvent. Compute the volume of oils in the used solvent. The volume of solvent displaced by this oil along with the volume of make-up solvent added during operations is equal to the solvent emission.

Section 7.5 Test Procedure for Determination of VOC Emissions From Bulk Gasoline Terminals

(a) Principle. VOC mass emissions are determined directly using flow meters and hydrocarbon analyzers. The volume of liquid gasoline dispensed is determined by computation based on the metered quantity of gasoline at the loading rack. Test results are expressed in milligrams of hydrocarbons emitted per liter of gasoline transferred.

(b) Summary of the Method. This method describes the test conditions and test procedures to be followed in determining the emissions from systems installed to control volatile organic compound vapors resulting from tank truck and trailer loading operations at bulk terminals. Under this procedure, direct measurements are made to compute the hydrocarbon mass exhausted from the vapor control system. All possible sources of leaks are qualitatively checked to insure that no uncontrolled vapors are emitted to the atmosphere. The results are expressed in terms of mass hydrocarbons emitted per unit volume of gasoline transferred. Emissions are determined on a total hydrocarbon basis. If methane is present in the vapors returned from the tank trucks or trailers, provisions are included for conversion to a total nonmethane hydrocarbon basis.

(c) Applicability. This method is applicable to determining VOC emission rates at tank truck and trailer gasoline loading terminals employing vapor collection systems and either continuous or intermittent vapor control systems. This method is applicable to motor tank truck and trailer loading only as per Section 5.13.

(d) Apparatus. The components essential to the evaluation of emissions from gasoline loading terminals are;

(1) portable combustible gas detector equipped to read 0 to 100 percent of the lower explosive limit,

(2) flexible thermocouple with recorder,

(3) gas volume meter, sized for the expected exhaust flow rate and range,

(4) total hydrocarbon analyzer with recorder (flame ionization detector or nondispersive infrared equipped to read 0 to 10 percent by volume hydrocarbon as propane for vapor control systems which recover the vapor as liquid; or 0 to 10,000 ppmv hydrocarbon as propane for incineration vapor control systems).

(5) barometer to measure atmospheric pressure,

(6) gas chromatography/flame ionization detector with a column to separate C_1 - C_7 alkanes; used if methane is present in recovered vapors or if incineration is the vapor control technique.

(e) Test requirements.

(1) No less than three 8-hour test repetitions will be performed.

(2) During the test period, all loading racks shall be open for each product line which is controlled by the system under test. Simultaneous use of more than one loading rack shall occur to the extent that such use would normally occur.

(3) Simultaneous use of more than one dispenser on each loading rack shall occur to the extent that such use would normally occur.

(4) Dispensing rates shall be set at the maximum rate at which the equipment is designed to be operated. Automatic product dispensers are to be used according to normal operating practices.

(5) Applicable operating parameters of the vapor control system shall be monitored to demonstrate that the control unit is operating at design levels. For intermittent vapor control systems employing a vapor holder, each test repetition shall include at least one fully automatic operation cycle of the vapor holder and control device. Tank trucks and trailers shall be essentially leak free as determined by the Director.

(f) Basic Measurements Required. The basic measurements essential to the evaluation of emissions from gasoline loading terminals are:

(1) the amount of gasoline dispensed from gasoline dispensers,

(2) leak check of all fittings and vents,

(3) the following items for the processing unit exhaust;

(i) temperature,

(ii) pressure,

(iii) volume of vapors

(iv) hydrocarbon concentration of vapors,

(v) gas chromatograph analysis of vapors if methane is present in recovered vapors.

(g) Test Procedure.

(1) Calibrate and span all instruments as outlined under paragraph (j) of this section.

(2) Install an appropriately sized gas meter on the exhaust vent of the vapor control system. For those vapor control systems where size restrictions preclude the use of a volume meter; or when incineration is used for vapor control, a gas flow rate meter (orifice, pitot tube, annubar, etc.) is necessary. At the meter inlet, install a thermocouple with recorder. Install a tap at the volume meter outlet. Attach a sample line for a total hydrocarbon analyzer (0 to 10 percent as propane) to this tap. If the meter pressure is different than barometric pressure, install a second tap at the meter outlet and attach an appropriate manometer

for pressure measurement. If methane analysis is required, install a third tap for connection to a constant volume sample pump/evacuated bag assembly as described in Method 3, Federal Register, 36:247, December 23, 1977.

(3) Measurements and data required for evaluating emissions from the system;

(i) at the beginning and end of each test repetition, record the volume readings on each product dispenser on each loading rack served by the system under test,

(ii) at the beginning of each test repetition and each 2 hours thereafter, record the ambient temperature and the barometric pressure,

(iii) for intermittent vapor control systems employing a vapor holder, the unit shall be manually started and allowed to process vapors in the holder until the lower automatic cut-off is reached. This cycle should be performed immediately prior to the beginning of the test repetition before readings required under paragraph (g)(3)(i) of this section are taken. No loading shall be in progress during this manual cycle,

(iv) for each cycle of the vapor control system during each test repetition, record the start and stop time, the initial and final gas meter readings, and the average vapor temperature, pressure and hydrocarbon concentration. If a flow rate meter is used, record flow meter readouts continuously during the cycle. If requiared, extract a sample continuously during each cycle for chromatographic analysis for specific hydrocarbons,

(v) for each tank truck or trailer loading during the test period, check all fittings and seals on the tanker compartments with the combustible gas detector. Record the maximum combustible gas reading for any incidents of leakage of hydrocarbon vapors. Explore the entire periphery of the potential leak source with the sample hose inlet 1 cm (0.4 inches) away from the interface,

(vi) during each test period, monitor all possible sources of leaks in the vapor collection and control systems with the combustible gas indicator. Record the location and combustible gas reading for any incidents of leakage,

(vii) for intermittent vapor control systems, the control unit shall be manually started and allowed to process vapors in the holder until the lower automatic shut-off is reached at the end of each test repetition. Record the data required under paragraph (g)(3)(iv) of this section for this manual cycle. No loading shall be in progress during this manual cycle.

(h) Calculations.

(1) terminology;

T_a = Ambient temperature (^oC)

P_b = Barometric pressure (mm Hg)

L_t = Total volume of liquid dispensed from all controlled racks during the test period (liters)

V_e = Volume of air-hydrocarbon mixture exhausted from the processing unit (M^3)

V_{es} = Normalized volume of air-hydrocarbon mixture exhausted, NM^3 @ 20°C, 760 mmHg

C_e = Volume fraction of hydrocarbons in exhausted mixture (volume % as $C_3H_{10}/100$, corrected for methane content if required)

T_e = Temperature at processing unit exhaust (^oC)

P_e = Pressure at processing unit exhaust (mm Hg abs)

$(M/L)_e$ = Mass of hydrocarbons exhausted from the processing unit per volume of liquid loaded, (mg/ℓ).

(2) Calculate the following results for each period of the vapor control system operation;

(i) volume of air-hydrocarbon mixture exhausted from the vapor control system:

$V_e = V_{ef} - V_{ei}$, or (M^3)

V_e = totalized volume from flow rate and time records.

(ii) normalized volume of exhausted mixture:

$$V_{es} = \frac{(0.3858\ ^oK/mmHg)\ VePe}{(T_e + 273.2)}\ NM^3 \text{ @ } 20^oC, 760mmHg$$

(iii) mass of hydrocarbons exhausted from the vapor control system:

$$M_e = (1.833 \times 10^6\ \frac{mgC_3H_8)}{NM^3C_3H_8} \times V_{es}C_e\ (mg)$$

(3) calculate the average mass of hydrocarbons emitted per volume of gasoline loaded:

$$(M/L)_e = \frac{\Sigma M_e}{L_t}\ (mg/liter)$$

(j) Calibrations.

(1) Flow meters shall be calibrated using standard methods and procedures which have been approved by the Director.

(2) Temperature recording instruments shall be calibrated prior to a test period and following the test period using an ice bath (0^oC) and a known reference temperature source of about 35^oC. Daily during the test period, use an accurate reference to measure the ambient temperature and compare the ambient temperature reading of all other instruments to this value.

(3) Manufacturer's instructions concerning warm-up and adjustments shall be followed for total hydrocarbon analyzers. Prior to and immediately after the emission test, perform a comprehensive laboratory calibration on each analyzer used. Calibration gases should be propane in nitrogen prepared gravimetrically with mass quantities of approximately 100 percent propane. A calibration curve shall be provided using a minimum of five prepared standards in the range of concentrations expected during testing;

(i) For each repetition, zero with zero gas (3 ppm C) and span with 70 percent propane for instruments used in the vapor lines and with 10 percent propane for instruments used at the vapor control system exhaust.

(ii) The zero and span procedure shall be performed at least once prior to the first test measurement, once during the middle of the run, and once following the final test measurement for each run.

(iii) Conditions in calibration gas cylinders must be kept such that condensation of propane does not occur. A safety factor of 2 for pressure and temperature is recommended.

APPENDIX C

GROWTH FACTORS FOR 1982 AREA SOURCE EMISSIONS

AREA SOURCE GROWTH FACTORS FOR 1982 EMISSIONS

A. Storage, Transportation and Marketing of Petroleum Products

1. Ship and Barge Transfer of Gasoline, Crude Oil and Chemicals

The growth factor of 1.3663 was determined by projecting the 1963-1976 tonnage of goods handled at the port of Little Rock and using the same growth rate through 1982. Tonnage of goods handled was obtained from Waterborne Commerce of the United States.

2. Service Station Loading

The growth factor was determined by first applying RACT (stage 1) to the emissions due to tank loading. To this value the breathing losses were added and multiplied by the growth factor of 1.2212 based on historical growth in gasoline sales. This was obtained from the Arkansas Department of Revenue.

3. Service Station Unloading

The growth factor of 1.2212 used above was also used for this category.

4. Aviation Gasoline Handling

The growth factor of 1.1660 was based on historical fuel consumption data for military, commercial, and non-commercial airports.

B. Industrial Surface Coatings

1. Large Appliances

The growth factor of 0.9030 is based on statewide employment figures for the large appliance industry (SIC Code 358) from County Business Patterns, for the years 1970-1976.

2. Magnet Wire

The growth factor of 1.1216 is based on Pulaski County employment in SIC Code 36 from County Business Patterns, for the years 1970-1976.

3. Transportation Equipment

The growth factor of 0.9633 is based on Pulaski County employment in SIC Code 37 between 1970-1976.

4. Cans

Only two years of employment data were available which resulted in an unrealistically high growth factor; therefore, a factor of 1.0 was used.

5. Paper

The growth factor of 1.1286 is based on Pulaski County employment in SIC Codes 26 and 27 for the years 1970-1976.

6. Fabric

The growth factor of 1.0000 is based on Pulaski County employment in SIC Codes 22 and 23, for the years 1974-1976, as earlier years are not reported.

7. Wood Furniture

The growth factor of 1.3865 is based on Pulaski County employment in SIC Code 25 for the years 1970-1976.

8. Flat Wood Furniture

The growth factor of 0.3676 is based on Pulaski County employment in SIC Code 24 for the years 1970-1976.

9. Other Metal Products

The growth factor of 1.0834 is based on Pulaski County employment in SIC Codes 34-3411 plus 35-358 for 1970-1976.

10. Other

The growth factor of 0.9057 is based on Pulaski County employment in SIC Codes 31, 32, 38 and 39 for 1974-1976, as earlier years were not reported.

C. Non-Industrial Surface Coatings

1. Architectural Coatings

Growth factor is based on Pulaski County employment in SIC Code 15 for the years 1970-1976.

2. Automotive Refinishing

The growth factor of 1.0749 is based on Pulaski County employment in SIC Code 75, for the years 1970-1976.

D. Other Solvent Use

1. Degreasing

The growth factor of 1.3866 was used to project 1982 emissions without RACT. This is based on Pulaski County employment in SIC coades 34 through 39 for 1974-1976. The 1982 emissions were then reduced by 40% for good operating practices as described in the CTG document for Solvent Metal Cleaning.

2. Dry Cleaning

The growth factor of 0.8612 is based on employment in SIC Code 7218 which uses Stoddard solvents, and SIC Code 7216 which uses perchloroethylene. These were then weighted to the amount of emissions from each solvent type during 1977.

3. Graphic Arts

The growth factor of 1.1620 is based on employment in SIC Codes 264, 265, and 27 for the years 1974-1976.

4. Cutback Asphalt

There was no cutback asphalt used in Pulaski County during 1977 and RACT for this category is the elimination of the use of cutback asphalt.

5. Other Solvent Use

The growth factor of 0.7497 is based on one-half the growth in employment in SIC Codes 19-39 and one-half the growth in population.

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